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*Azalea Meadow at the Arboretum*

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### ARBORETUM ACTIVITIES J. M. F., Jr.

*Beginning with this issue and under the above title we are initiating a series of occasional reports devoted to work accomplished or in progress at the Arboretum. Here, also, will be announced special events of interest to the public, such as the height of the Azalea season, which should be about the middle of May.*

Work on a number of important undertakings at the Arboretum has been seriously handicapped by the hurricane of October 15, 1954, which left in its wake a toll of uprooted trees and broken branches. The exact extent of hurricane damage was discussed in the preceding issue of the Bulletin (Vol. 6, No. 1), and it need only be added here that a major portion of the efforts of our small staff has, for the past five months, been devoted to the cutting up and removal of fallen trunks and limbs and the repairing of injured trees and shrubs. This prodigious task is now essentially accomplished and it is again possible to turn our attention to a number of projects, the completion of which will, it is hoped, considerably enhance the beauty and usefulness of the Arboretum. A few of these are enumerated here; others will be described in future issues of the Bulletin.

#### PLANTING PLANS

Since there are several large areas within the Arboretum on which permanent plantings have never been established, an intensive study is now being made of a planting plan which will make possible the development of interesting and attractive plant groupings in suitable locations. It is our feeling that, with certain exceptions, an attempt should be made to bring together as many species and varieties of a genus as can be reasonably assembled in a single area. This does not mean that fine specimens of such groups as *Taxus*, *Buxus*, *Ilex*, *Cornus*, *Viburnum* and *Lonicera* will not be found scattered throughout the grounds. Indeed, many such specimens or groupings of them already exist and there is no intention of disturbing them. However, since many visitors

*(Continued on page 23)*

# IN SEARCH OF NATIVE AZALEAS

HENRY T. SKINNER

(Continued from page 10)

## NEW YORK AND WESTWARD

A check of the flowering guide at this stage indicated the need for northern samples of the early species and for more westerly collections of both these and *R. calendulaceum*. Accordingly on May 26th a route was chosen via the Pocono Mountain area of northern Pennsylvania to the Finger Lake region of central New York for Pinxterbloom and Rose Shell Azaleas — or for what passes as these two species after their too rapid or too sociable post-glacial trek to the Carolina Hills of Ithaca. They were here in abundant bloom, in excellent color and in oft-proved hardiness but both species are a little more like one another than are *R. roseum* and *nudiflorum* of Virginia—a fact which has worried both botanist and azalea growers of the north on more than one occasion. Good collections of New York State Pinkshell were also made in the entertaining company of Dr. C. G. (Rhododendron) Bowers in the hills above Binghamton.

Travelling southwest into Pennsylvania the same azaleas were now getting past bloom except for some very showy specimens of *R. nudiflorum* in the high and late-season plateau area of Somerset County, Pennsylvania. On further into West Virginia *R. roseum* and *nudiflorum* were in flower at higher elevations and in the region south of Morgantown and Elkins *R. calendulaceum* was abundant in the early, large flowered form in shades of yellow to deep orange. Recognizing a possibly parallel situation to that in certain of the native blueberries Dr. W. H. Camp had earlier suggested that orange *R. calendulaceum* in this evidently tetraploid early flowering phase may quite logically represent a species originally derived from early hybridization between diploid red and yellow progenitors. Towards furnishing proof for this hypothesis an evident need was the field discovery of such suitable red and yellow diploid azaleas, if they should still be in existence. The Oconee Azalea is a red with suitable characters except perhaps, its time of flowering, and at this stage of collecting it was hoped that a small-flowered, fairly late, clear yellow azalea might perchance be found on some secluded slope of these westerly hills of the Virginias, Kentucky or in the Ozarks. Anticipating our story we can say that a late flowering diploid yellow was never found, and probably never existed but the diligent though fruitless search for it covered many square miles of territory and was always interesting. A number of unusual yellows actually turned up in West Virginia, in Kentucky, Georgia and Tennes-

see but always they were solitary plants and usually the product of hybridization between a late phase of *R. calendulaceum* and either *R. arborescens* or *viscosum*.

## HYBRIDS

One of the very interesting hybrid swarms was found on June 14 on the eastern slope of Spruce Knob Mountain in West Virginia. The plants were scattered through an abandoned pasture in a region where *R. calendulaceum*, *nudiflorum* and *roseum* all grew and bloomed together. The progeny of these triple matings were bizarre in the extreme — short and tall bushes bearing large or small flowers in every color from coral pink through salmons to rich lavender, pale yellow or pure white. The last was large flowered and otherwise identical with the Flame Azalea. Such happenings, exciting to the horticulturist, could obviously be most confusing when unexpectedly encountered in an herbarium where such specimens customarily lack any reference to flower color or to peculiarities of their occurrence. White-flowered hybrid progeny seem relatively frequent when parental *R. nudiflorum* is involved. (Fig. 6)

Returning to Virginia, final collections were made from the highest elevations of the Pinnacle Mountain transect before again striking southwest for later investigation of the more southern species. A later flowering and somewhat redder



Fig. 6. *R. calendulaceum nudiflorum*

phase of Flame Azalea was found in partially open bud on White Top Mountain and High Nob in southwest Virginia, at a time when the last blossoms of the normal large and orange-flowered *R. calendulaceum* were scattered on the lower slopes. This same joint occurrence was likewise met on June 6th on Big Black Mountain in Kentucky, only here at the higher elevation of over 4100 ft. the later "Camp's Red" phase of the summit would obviously not be at its best for another two weeks or more.

#### IN QUEST OF *R. cumberlandense*

Planning a return to the interesting azaleas of Black Mountain, we headed northwest for a general Kentucky reconnaissance in an eleven county circular swing to Yahoo Ridge, type locality for *R. cumberlandense* at the Kentucky end of the Cumberland Plateau.

Within a few miles the first little red and red-orange flowered azalea plants were found on a ridge of Pine Mountain in Letcher County, an azalea which in "best" forms makes a low, twiggy bush, often quite stoloniferous, with glossy green leaves often glaucous beneath and which may or more probably may not be quite the same as the late azalea of Black Mountain. At least on Pine Mountain this is undoubtedly *R. cumberlandense* of E. L. Braun's description and its smaller, thin-tubed flowers are immediately suggestive of a diploid if the earlier, coarsely large-flowered Flame Azalea is truly tetraploid — a point to be tested by later cytological examination of living plants collected for this purpose.

Leaving Pine Mountain there was an interval of several miles in which only normal *R. calendulaceum*, past bloom, was seen, but again at higher elevation in Owsley County beautiful little geranium-red azaleas were in shining bloom on a rocky cliff face; they remained with us in Clay County in Laurel County and in fact seemed quite common throughout these wooded hills of southeast Kentucky, all the way to Yahoo Ridge where the type locality for *R. cumberlandense* was revisited with the aid of detailed directions kindly furnished by Dr. Braun. Unfortunately the station where Braun had collected some time after logging operations in 1935 was now so rapidly reforesting that the shade was becoming heavy and the azaleas poor — a rotation which was frequently observed on this journey. Again and again the most striking displays of azaleas were in open woodland which had obviously been logged, cleared or burnt a few years previously. Presumably it is the scattered parent plants which burst into bloom with the sudden sunlight, set abundant seed and populate the forest floor before young trees again almost shade them out. In the long view one gains the impression of ephemeral, constantly shifting

populations, except perhaps in the case of conservative *R. prunifolium* of West Georgia or *R. speciosum* of the Savannah River. By the average plant age the latter species seem to have occupied the same territory for many years. They reproduce sparingly.

As noted in this region perhaps the finest single Kentucky collecting point for the Cumberland Azalea was on a fire tower hill in west central Knox County. The road up this hill was one of those eroded rock and mud affairs which may have been passable to a jeep in good weather but which caused the Chevrolet to rest quietly near the main highway during an attack on foot. The hill was covered with open deciduous forest and towards the top, flowing over the ridges and down the sides of steep gullies was a multicolored riot of azaleas. It must have been a fairly old growth for while some of the flat-topped bushes were only waist-high others were well above eye level, indicating that fair height is attained by this species, at least in partial shade. Under these conditions, and compared with normal Flame Azalea, the flowers seemed especially thin-tubed and delicate and with a color luminosity, in the filtered sunlight, which the other wholly lacks. The shades of color were infinitely and widely variable from pale straw yellow through yellow-orange to red, and from salmon through pink to translucent cerise as lively as shot silk. Such diversity was often later found, although a constant leaning toward orange-red and red suggests that the latter may possibly have been the original color of this azalea.

Having confirmed the Kentucky occurrence of this distinct phase of former *R. calendulaceum* the next obvious task was to determine with some accuracy the limits of its distribution. So far it had been confined to the northern heights of the dissected west escarpment of the Cumberland Plateau so that a logical course was to follow this westerly escarpment southward — and the decision proved



Fig. 7. Valley of the Sequatchie River

a wise one. Leaving Kentucky on the 9th of June, this same little azalea was followed in comparative abundance into the upland woods of Scott County, Tennessee, into Fentress County, Overton County, Van Buren County, Sequatchie County, both west of the Sequatchie Valley (Fig. 7) and to the east on Signal Mountain. From here we were headed for Georgia — and the azalea was there too on Fort Mountain in Murray County. Continuing at about 3000 ft. elevation (in contrast to early *R. calendulaceum* of the lower mountain slopes) it was found towards the summit of Mt. Oglethorpe in Pickens County, and on Branch Mountain in Dawson County. It was on this mountain that a spot of brilliant red, like a scarlet tail-light, shone from the top of a cliff bordering the new highway 136. This little beacon was too fascinating to pass up, even though the only approach lay by way of a long flanking climb. But the reward was a tiny, twiggy, rock-clinging azalea plant 6 inches high, a foot across, gray leaved and covered like a pin cushion with its little red bells — as extreme a form of this *R. cumberlandense* as one could hope to find and a gem for the garden if its habitat is not unduly altered by cultivation. (Fig. 8) Traveling northeast into adjacent Lumpkin County the azalea stays with us near Woody Gap. In Union County it is especially abundant on the mountain slopes above Lake Winnfield Scott and not far away, just east of Wolfpen Gap in Vogel State Park, it covers a hillside in a billowy patchwork of clear yellow, orange, orange-red, cerise and all shades of salmony pink to apricot — both colors and plants so reminiscent of those of our fire tower hill in Kentucky that even before making a detailed check of less obvious characters one could scarcely doubt that this was the same Kentucky azalea. But was it? This particular spot happened to have been sought out by design for it is the type locality of *R. Bakeri* described by Lemmon and McKay in 1937, four years before *R. cumberlandense* was named by Braun from Yahoo Ridge. Since both descriptions fit these plants with reasonable accuracy it would seem that this gay little bush of the Cumberland Plateau must soon shed its dual personality to be recognized by the single, prior, though less happily descriptive name of *R. Bakeri*. Here in Georgia its color may tend slightly more toward the yellow and yellow-orange and its flowers may be slightly larger than when it was seen in Kentucky but such differences would seem to be of very minor consequence.

#### CONFUSION IN MACON COUNTY

Still anxious to find where else this little late red azalea might be, another visit was next paid to the Nantahala region of North Carolina, a few



Fig. 8. *R. Bakeri* in northern Georgia

miles across the Georgia border. The first plants were found in a deep valley on the approach to Wayah Bald from the west. The plants were 2 ft. high in stoloniferous patches deep red in color and just coming into bloom at this higher elevation. But they were not alone. On all sides were bushes in a bewildering array of colors, of heights to fifteen feet or more and of flower sizes to 6 centimeters across the "wing" petals. Either *R. Bakeri* had gone crazy or it had met up with something else. The latter seems probably the better guess, for not far away were a few late-flowering individuals of normal, early Flame Azalea. The sampling and collecting of this amazing population consumed a full half day during which time the characteristics of these intermediates became reasonably familiar. Finally heading to Nantahala Lake and Wayah Bald, imagine our astonishment at discovering that the fast opening azalea display around the lake and well up the slopes of the mountain was composed not of *R. Bakeri* or "normal" *calendulaceum* but entirely of recurring batches of these vari-colored intermediates which eventually settled down to something resembling a reasonably uniform "type" of their own.\* Other collections were made on later visits to this region, and many more in principally orange and orange-red colors were subsequently found at higher elevations (above 3000 ft.) north through the mountains and right back again to southwest Virginia and Kentucky. A seeming third phase of the *R. calendulaceum* complex presents a puzzling pattern which will need much further study for elucidation of its true nature and origin; but the fact of its existence begins to shed light on the confusing flowering-time behavior of *R. calendulaceum* from different collection sources.

#### AND INTO ALABAMA

Having followed the Cumberland Azalea to Georgia and North Carolina there remained the possibility that it might also occur in Alabama — since the Cumberland Plateau enters into the northeastern part of this state. On the eighteenth of June the Chevrolet was consequently headed towards Jackson County, Alabama. Along the way some excellent Sweet Azalea, *R. arborescens*, was found in full flower, white with pale yellow blotch, growing with Catawba Rhododendron in a moist valley near Cloudland in DeKalb County and again not far away, while after crossing the Tennessee River and making a sharp climb of the steep ascent of the plateau north from Scottsboro in Jackson County abundant Cumberland Azalea was still in flower in open forest near Kyles on Crow Mountain. It was certainly in northern Alabama and on reflecting the matter in camp that night there came a wild thought of Alabama's highest point, isolated Mt. Cheaha, a hundred miles south in Talladega County. Pulling a long shot, we packed lunch next morning, took to the mountain road which became poorer and very dusty through the forest climb up Cheaha, and by noon were enjoying this lunch seated amid Cumberland Azalea right on the summit of the mountain! They were a little past bloom but there was ample color to aid recognition of this gratifying find at a lone point so far from Kentucky and Yahoo Ridge. But this was no large batch of azaleas; beneath the windbent oaks were perhaps a few hundred plants in this colony which must have been isolated for a very long time. It was hoped that they might show something more of original characters or flower color but on superficial examination they were similar indeed to the little azalea we had followed so far. It is of passing interest that Rehder did not record the existence of a *calendulaceum*-like azalea in Alabama and that the reference in the Eighth Edition of Gray's Manual should properly refer to the Cumberland Azalea rather than to *R. calendulaceum* proper.

#### THE TEXAS AZALEA

Two further geographic possibilities remained for this fascinating plant, the southward extension of the Cumberland Plateau south of the Tennessee River in North Central Alabama and — a very long shot — the Ozark Mountains of Arkansas and eastern Oklahoma which has azaleas and certain interesting representatives of other eastern

\*Though not realized at the time, distinctive qualities of the Flame Azalea of the Nantahala region have previously been pointed out by Braun in *The Red Azalea of the Cumberlands*, Rhodora, 43: 33, 1941.

plants. The next day, June 20th, was spent in the *R. alabamense* hills of Cullman and Winston Counties, but only late forms of the latter species were found, no Cumberland Azalea since the hills are perhaps too low and, strangely, not even any *R. arborescens*, which had been expected.

No collections were made on the long drive through Hot Springs, Arkansas to Mt. Ida for the night but luck was better during the next two days coverage of the principal mountain peaks of the Ouachita and Boston Mountains, the length of Rich Mountain and adjacent LeFlore County, Oklahoma, impressive Magazine Mountain, Flat Top Mountain and northerly White Rock Mountain in Franklin County, Arkansas. There was no Cumberland Azalea as had been vaguely hoped but local *R. oblongifolium*, the Texas Azalea, was found in several places with sufficient plants still in flower for at least representative collections. This generally white and rather small flowered species is confusing in that it so frequently grows side by side with a pubescent-leaved pink azalea akin to *R. roseum*, and evidently breeds with it; the white form may be more adapted to moist valley sites and the other to drier hillside slopes but the line of preference is not strong. There is needed an earlier season and more careful study of these Ozark plants than was possible in this too rapid survey.

On the third morning in Arkansas, on June 24th, the car was again headed back towards the now-passing eastern azaleas. It chanced to be a Sunday, with Sunday drivers in slow lines on the highways but nevertheless nearly 600 miles were covered before nightfall in eastern Kentucky. No azaleas were collected; none was seen and they were doubtless sparse to nonexistent over most of the rich agricultural land traversed.



Fig. 9. Gregory Bald

## BACK TO THE ALLEGHENIES

The next week was spent in a run north through the mountains of Virginia and West Virginia and back south into Tennessee and North Carolina in quest of late forms of *R. calendulaceum* and of northerly *R. arborescens* and *viscosum*, wherever it might occur. A last visit was paid to the late red azaleas of Kentucky's Big Black Mountain and more of the Cumberland Azalea was found in Wise County, Virginia, but farther east at elevations of 3000 ft. and above it gave way to the late phase of *R. calendulaceum*, mentioned earlier, which was also of plentiful occurrence on the high points of the Alleghenies from Grandfather Mountain and Mt. Pisgah, west to the Tennessee border. Throughout this tour the Sweet Azalea was fairly plentiful along streamsides of the upland valleys and in some places, as at Mountain Lake, Virginia, and on Great Pisgah in North Carolina, it was hybridizing freely with *R. viscosum* to produce variable and often pink-flowered hybrids quite similar to entire populations seen in northern Pennsylvania a month later.

The Sweet Azalea tends to be quite variable in certain characteristics and throughout its range from New England to Georgia and Alabama. It may be variable in habit from low, widespread and bushy in open places to tall and leggy in denser woods; its foliage may be glaucous beneath or entirely green; its corolla may be pure white or carry yellow blotches of varying intensity and in flower size it may be a plant of mediocre attraction to one of quite outstanding quality. A clone with especially large and showy flowers was found on the east fork of the Pigeon River in Pisgah National Forest but others almost equally good were seen at intervals. Such individuals from the horticultural standpoint were quite superior to overextolled "var. *Richardsonii*" of Wayah Bald whose flowers are medium in size and whose dwarfness seems a product of wind-swept exposure which is not expressed in the forest shelter at a few feet lower elevation.

## A MOUNTAIN-TOP MARVEL

A fine fourth of July found the Chevrolet headed towards headquarters of the Great Smoky Mountains National Park in Gatlinburg, Tennessee, but wisdom prevailed in time for the effective substitution of a collecting detour over little-travelled Max Patch Mountain. Holiday makers had thinned somewhat by the next day, permitting a visit to Park Headquarters for the advice of Arthur Stupka, Park Naturalist, concerning the azaleas of the park and especially of now famous Gregory Bald on the park's southern rim. Representatives of the Gregory Bald population, as col-

lected earlier by W. H. Camp, had been inconclusively studied previously and there was a real need to discover what this puzzling situation might actually be. Mr. Stupka was helpful indeed in providing access to the Park Herbarium and in giving suggestions on approaches to Gregory. A day's food supplies were laid in, the distance was covered to Cades Cove, a pack was made up with temporary presses, photographic equipment and a blanket and the stiff 4½ mile climb to the mountain top was started in rather late afternoon. A cabin at about 4,900 ft. elevation was reached at dusk, leaving just time to complete the distance to the summit for a preview of the azalea display before cooking supper and turning in for a night's rest. Unfortunately the "night's rest" was enjoyed in the damp cold against which one blanket afforded little protection. It was also amid rather noisy wildlife from inquisitively reconnoitering mice to larger creatures, perhaps bears, which by morning had spirited away my lone loaf of bread. But there was enough food for a good breakfast and with warming sunlight and the azaleas, discomforts were soon forgotten. (Fig. 9)

The azaleas of Gregory Bald are at first glance bewildering and almost unbelievable. The mountain is a true "bald" having a broad, grassy summit fringed by scrub trees leading quickly into vigorous deciduous forest. The origin of the bald is unknown but it is probably man-made, resultant from earlier Indian grazing. It is the marginal region between trees and the grass sod which supports a peripheral band of a bizarre collection of azaleas — thousands of plants in every imaginable hue from pure white to pale yellow, salmon yellow, clear pink and orange-red to red. Many of the flowers are yellow blotched, many of the bushes are stoloniferous and foliage varies from normal to deep glossy green, often glaucous beneath. Obviously it is a complicated hybrid swarm dating, in the older plants, to perhaps thirty years ago when some happening such as a brush or forest fire may have been responsible for the start of this strange and fascinating collection. Assuming that these were in fact hybrids the evident procedure was to search for the species which might have been involved in the hybridization process. The red and red-orange colors were an obvious lead and bushes of a *Bakeri*-like late flowering phase of *R. calendulaceum* were soon recognized, particularly on the west and southern sides of the bald. Such azaleas had been observed lower on the trail on the approach to the summit. From previous experience the clear pinks suggested hybridization between a red and white and white clones gave surer evidence of a parent of this color. Glossy leaves and glabrous shoots suggested that one such white might well be *R. arborescens*. A

quick search for this species was unsuccessful but it too had been seen on the approach to Gregory Bald. That it actually grew in the vicinity of the Bald has since been confirmed by F. C. Galle of the University of Tennessee who has made a special study of this population. In the search for *R. arborescens* a visit was paid to nearby Parson Bald a mile to the south and on this mountain was found a splendid growth of a second white azalea, the dwarf and stoloniferous form of the Swamp Azalea, *R. viscosum*, var. *montanum* whose characteristic small, sticky flowers and suckering root system had also been recognized as being carried by many of the Gregory hybrids. *R. viscosum* may have been growing on Gregory itself or its pollen could easily have been carried this short distance by flying insects. Certainly it, with the other two species mentioned, was involved as an original parent of these plants. These three species are the only ones likely to be met at this elevation and in this particular region. Full collections were made of the Gregory population for later detailed study. While hybrid swarms involving as many species are not rare among eastern azaleas, no other yet seen has equaled this one in impressive size and effect. While many of the plants are beautiful from the horticultural standpoint it is fortunate that they are protected by National Park authorities for all to enjoy. Each color could be simply reproduced by cross-pollinating the same species under artificial conditions.

The study and photographing of this collection was still not complete by dusk, necessitating a second night on the mountain which was rendered slightly more comfortable by a harvest of fern fronds for softness and a little warmth. Dry cereal provided a slim breakfast next morning but work was completed in time for a rapid descent starting by noon.

Being reasonably close to Knoxville, Tennessee, a visit was paid to the University to discuss azalea problems with members of the Department of Botany and to review briefly a fine set of herbarium material well worthy of later study. This was July 9th and since more late material was still needed from the mountain areas a route was chosen via Wauchesa Bald in Graham County, North Carolina, Robbinsville, a return to Wayah Bald via the Winding Steps road, a northern swing over Cowee Bald, memorable for dew-laden red azaleas and a brilliant sunrise over its cloud filled valleys, and thence to Highlands, North Carolina. The principal collections of this tour consisted of *R. arborescens*, late specimens of the red-orange Flame Azalea including an especially fine stoloniferous clone in full bloom near Nantahala Lake on July 10th, and *R. viscosum*, var. *montanum*, also in excellent bloom, pure white, in low thicket



Fig. 10. *R. arborescens*

growth in open woods near Highlands. Occasional hybrids of this plant with the Sweet Azalea can be striking with their large pink flowers, as are similar hybrids with *viscosum* itself at lower elevations. (Fig. 10)

#### THE PLUMLEAF AZALEA

It being now the 12th of July a reference to the collecting map indicated that the late red azalea of Georgia, *R. prunifolium*, should be in flower. Its type locality is near Cuthbert in Randolph County, southwest Georgia, and in this direction the Chevrolet was turned from the hillsides, the rhododendron forests and the delightful climate of Highlands, North Carolina. The only detour made in crossing Georgia was in search of the Sweet Azalea at the southernmost part of its range in Upson County of central Georgia. The search consumed nearly a full day but the azalea was at last found in splendid quantity and, strangely enough, in full bloom in spite of this low elevation so far south. In pure white flower it followed the banks of a small Moccasin-infested tributary of the Flint River, the same azalea by all outward characteristics as its counterpart of 800 miles away in West Virginia.

Fort Gaines, Georgia, is a sleepy little town on the banks of the Chattahoochee, the river separating Georgia and Alabama which, 75 miles farther south, joins the Flint River (from Upson County)

to become the Appalachianicola of northern Florida. Both Fort Gaines and Cuthbert, twenty miles northeast, are situated in a region where the clays of the rising Coastal Plain have been cut into deep gullies by small meandering streams. The sides are often so steep that the only access is by wading the stream, and one is almost forced to do this (in spite of the Water Moccasins) by the dense cat-briar tangles of the wooded surroundings.

It is in these gullies of a few Georgia and Alabama counties, generally centering on Fort Gaines, that the Georgia late red azalea, *R. prunifolium*, is at home. (Fig. 12) Here, on steep slopes, wherever enough light has penetrated to permit flowering, it is found in round-topped bushes up to twelve feet high in reds, red-oranges, apricots and orange-yellows. The color range is not far different from that of the Cumberland Azalea and after seeing the latter for so long one is impressed by the similarity between the two. They both have those characteristic ridged flower tubes in the bud stage; they are both late, both red, and in more detailed morphology have little to show reason why they could not be quite logically and quite possibly regarded as high and low elevation derivatives from a common ancestor. By its lateness of bloom and geographic isolation *R. prunifolium* has not had the opportunity for recent gene exchange with other species. Thus it lacks the aggressive adaptability of its mountain counterpart, so that now, even in its chosen locale, young seedlings are seen so infrequently that one wonders how much longer it may persist without more effective protection than it now receives. (Fig. 11).

The type locality for this species, 2¼ mi. N. E. of Cuthbert, is now a golf course with no azaleas evident but a good collection was made in a small ravine 1¼ miles distant. The visit to Fort Gaines also provided an opportunity to discuss mutual



Fig. 11. *R. prunifolium*



Fig. 12. *R. serrulatum*

interests with that authority on southern azaleas, Mr. S. D. Coleman, who not only showed me his own unusual plants, so well tended and arranged, but who also provided a valuable lead to a curious little May-flowering white azalea of Central Georgia and Alabama, hitherto overlooked. The next day or so was spent in following this low growing plant, now past bloom, as far as Mississippi. On a basis of characteristics which lie somewhere between *R. viscosum*, *serrulatum* and *oblongifolium*, it has not yet been taxonomically assigned as a previously described entity and should certainly be credited to Mr. Coleman if a new designation is warranted.

#### HAMMOCKSWEET

Returning to Mississippi on a stifling 18th of July with the thermometer hovering around 104°F. the first plants of true *R. serrulatum*, the Hammocksweet Azalea, were found in flower the day following on the edge of a wooded swamp in Jones County. (Fig. 12) Through the following week and a half, it was chased in equally good flower into southeastern Louisiana, east around the Gulf Coast to within a few miles of Lake Okeechobee in South Central Florida, back to its type collecting locality in Lake County, Florida, north again to the edges of the Okefenokee Swamp and again east to Folkston, Georgia, and the type locality of Rehder's *R. serrulatum* var. *georgianum*. Throughout this thousand miles and more the Hammocksweet Azalea showed no excessive variation. At times it is true that its leaves or dormant buds became more silky pubescent, its flower pedicels varied from pale green to deep red in color and its flowering season was obviously

prolonged in lower Florida where single individuals may bloom from July to October or later, but essentially it remained the same sticky-tubed and rather inconspicuous little white azalea of the bog tussocks and the cypress islands of the southern waterways. At times it formed rounded bushes ten feet tall, but it was often low or producing but a few rangy stems seeking light through a dense cover of vine-covered holly or palmetto. The very late flowers of individual specimens could well be a characteristic worthy of exploitation in some future race of garden hybrids.

#### THE NORTHWARD RETURN

With good collections of *R. serrulatum* one could feel with fair satisfaction that the gamut of southern azaleas had been about run, until such time as return visits to puzzle areas might be called for in another year. A northward return was thus in order, so planned as to catch any further outliers of the *R. serrulatum* complex together with a fairly detailed survey of its northern counterpart, *R. viscosum*, which should now be in scattered bloom well into New England.

Leaving Folkston on the 28th of July, our route headed towards Savannah and the Georgia side of the Savannah River where late azaleas had been observed during the *R. speciosum* season. The only collections this day were of fine specimens from a northerly distribution of *Befaria racemosa*, the curious ericaceous Tar Flower which, with its spikes of pink blossoms, is suggestive of a primitive azalea form. Here in coastal Georgia it grows on dry soils of the Pine-palmetto forest. Farther south the scattered clumps of this single North American representative of a Central and South American genus is a frequent sight along the Florida roadsides.

Occasional Hammocksweet Azaleas were seen on the way to Savannah while, bypassing this city, the first low white azaleas resembling *R. viscosum* rather than *R. serrulatum* were found at a woodland edge in Effingham County. Farther along, in Screven County, there was found a swamp near Oliver where the swamp tussocks were covered with quite normal *R. serrulatum*, the swamp margins with a very variable dwarf and stoloniferous azalea, sometimes highly pubescent in its buds and leaves which was clearly much more akin to *R. viscosum* than the other species. On drier land an outer circle of *R. canescens*, past bloom, completed the azalea picture. This was the last collection of *R. serrulatum*, which does not seem to spread north of the Savannah River. It is clearly a region where the two late white azaleas meet and as such it is likely that gene exchange with resultant variability could be expected here in East Central Georgia.

Crossing the Savannah River on Route U.S. 301, this road was followed north to Baltimore, as it parallels the coast some 100 miles inland. Throughout the distance of the Carolinas, Virginia and Maryland, *R. viscosum* was mass-collected, usually in good bloom, at intervals of approximately 60 miles. From Baltimore it was followed past Philadelphia into New Jersey, across New Jersey to Connecticut, and across Connecticut and Massachusetts to Cape Cod and even to the island of Martha's Vineyard where it was flowering on August 8th. This was another thousand mile run in which the variation of one species could be observed, step by step, until it became a fascination that terminated only as the last plants were collected. From the dwarf, twiggy and semi-evergreen bushes of the marshes of South Carolina to the tall, gray leaved and large flowered shrubs of the pond margins of Cape Cod, the Swamp Azalea is much more changeable than its sister of the Gulf Coast. Rehder has divided it into eight varieties and forms. One could make these many more, or less, depending upon the viewpoint of the observer. It seems certain that not a little of the trouble is due to *R. viscosum* and *arborescens* having met on occasion in the northern states, as was strongly suggested by the last New York State and Pennsylvania collections on the return to Philadelphia. In some of these northern swamps genes have been so freely exchanged between these two species that nomenclatural assignment of present populations becomes virtually impossible. The situation is similar to that previously noted with regard to *R. roseum* and *nudiflorum*. But in spite of these local happenings, *R. viscosum* can still be regarded as "good" a species, though variable, as *R. roseum*, *nudiflorum* or *serrulatum*.

This last run from central Pennsylvania to Philadelphia was on Sunday, August the 12th, and thus ended, after 21 weeks and 25,000 miles of almost continuous collecting, our quest for native azaleas. A few additional collections have since been made, as doubtless there will be others in the future. From this major field survey were secured 8,000 herbarium specimens and 500 living plants whose study should throw much new light upon the nature and the behavior of these plants. The herbarium specimens, now mounted and catalogued, are deposited in the herbarium of the Morris Arboretum of the University of Pennsylvania, at which institution the collection of living plants is also maintained for future observation and for their use in current cytological studies.\*

\*Editor's Note: Dr. Skinner also prepared, as a matter of record, a listing of herbarium and living collections. This is available in mimeographed form and will be furnished without cost, on request, to libraries, herbaria or individuals.

## ARBORETUM ACTIVITIES

(Continued from page 14)

come to the Arboretum primarily to see representative collections of such ornamentals as crab-apples, lilacs, azaleas and magnolias, or such special-purpose forms as ground-covers, hedge-plants or climbing vines, the new plan has as its main objective the concentration of large and important genera on carefully selected sites.

This is a long-term project, but considerable progress has already been made in the setting out in their permanent areas of material from our own nurseries as well as plants secured from other sources. There already exist noteworthy collections of hollies, azaleas and boxwood not far from Gates Hall, while on the area north of Northwestern Avenue a basic representation of fine varieties of lilacs has been established. This will be augmented by additional varieties as they become available. Nearby areas have been designated for *Ligustrum* and *Forsythia* and some members of these groups are already in place. A conspicuous location on a low, south-facing slope has been selected for the flowering crabs and cherries and a beginning has been made in the building up of a really fine display of these spectacular plants. The location of many other groups has been determined and specimens have already been or soon will be set out in their permanent sites.

### MICHAUX QUERCETUM

The nature of this unique project, which was initiated in 1953 under a grant from the American Philosophical Society, was described by Dr. J. R. Schramm in a previous issue of this Bulletin (Vol. 5, No. 4). The purpose, briefly, is to grow in especially prepared seed beds and under rigidly observed conditions acorns from as many different species of oaks as are hardy in this area. In order to make possible comparative studies, acorns of the same species from representative portions of its natural range are desired and whenever possible, 100 acorns of a single collection are planted.

By the end of the first season (1953) about 13,000 acorns, representing 37 species and 23 states, were planted. Of these, more than 8,300 germinated and grew during the season of 1954. This spring, after having spent two winters in the seed beds, these seedlings are being transplanted to a nursery where, during the coming summer, continuing observations will be made of their performance.

Meanwhile, during the autumn of 1954, over 10,000 additional acorns, representing 29 species and 19 states, were received and planted. This required the construction of two new rodent-proof seed beds in addition to the three already in exist-

ence. It is planned to continue this project in future years and to extend the area of collecting to include portions of Europe, the Near East and the Orient. The Arboretum is grateful to the many collaborators who have collected and forwarded seed lots from their local areas.

### THE LANGSTROTH BEE GARDEN

This unusual and attractive garden devoted to the growing of trees and shrubs which are important honey plants, was dedicated with appropriate ceremonies on October 20, 1951 (See Vol. 5, No. 2). Mr. Fred W. Schwoebel, an eminent apiarist who devotes a great deal of his time to the garden, has suggested the addition of a considerable number of species which are visited by bees. This has already been largely accomplished and at the same time the collection has been rearranged to create a more pleasing appearance and provide for easier maintenance.

### THE NURSERIES

The grounds of the Arboretum contain six nursery plots, some of which were started as long as twenty years ago. Some of the surplus stock in these plots had become too large for transplanting and, since it occupied space needed for other purposes, much of it is being or has been destroyed, care having first been taken to secure propagating material from the more valuable species. There still remains a considerable amount of surplus material suitable for transplanting and it is our policy that this should be disposed of in the following manner:

a) Whenever needed for planting on the campus of the University of Pennsylvania surplus material should be made available from the Arboretum nurseries. This policy is already in effect and this spring a considerable amount of plant material has been transported from the Arboretum to the University for the purpose of beautifying the campus.

b) Surplus material is being offered to other arboretums and botanical gardens which in turn furnish us with plants needed to round out the collections of the Morris Arboretum. Since July 1, 1954, more than 500 items have been sent out from here on this basis of exchange.

### SEED LIST

Most important arboretums and botanical gardens throughout the world annually distribute a list of seeds available in exchange. This had formerly been done at the Morris Arboretum but the practice had been discontinued two or three years

ago. It has now been reinstituted and in the autumn of 1954 a carefully selected list of seeds available at the Morris Arboretum was distributed to the institutions on our mailing list.

The seed list for this year was a small one containing 30 items and one special offer (a limited quantity of control-pollinated seeds of azalea from our breeding experiment gardens). Thirty-six requests for seeds from this list were received — nine domestic and twenty-seven from fifteen foreign countries. In all, 152 packets of seed were distributed.

#### NORTHEAST FOREST EXPERIMENT GROUP

Since 1942 several staff members from the Northeast Forest Experiment Station have been housed at the Morris Arboretum and have utilized our facilities in the laboratories, greenhouses and nurseries. In return, the presence of this group has provided an intellectual stimulus for members of our own staff, and the relationship has proved a happy one. It is our hope that this program of mutual cooperation will long continue.

Before coming to the Morris Arboretum, Dr. Ernest J. Schreiner, Geneticist-in-Charge, looked over various possible locations from Boston to Washington, D. C., and found out that the Philadelphia area offered the greatest number of mature exotic trees for breeding purposes of any region in the East. This interest in exotics stems from the fact that the Philadelphia area was the center of botanical activities in colonial times.

#### EDUCATIONAL PLANS

It was the expressed wish of the late Lydia T. Morris, who generously bequeathed her estate to the University of Pennsylvania, that the Arboretum should render an educational service stemming from its rich and varied collection of native and exotic plants. This is a project which needs to be carefully studied and well organized, and a great deal of attention is being given to it in our frequent staff meetings. At present we can only point to the fact that numerous organizations (horticultural societies, garden clubs, Scout groups, etc.) who come to the Arboretum are

given specially guided tours or informal lectures on such subjects as may interest them. A great deal needs to be done to expand this type of service and even to offer regular courses of instruction comparable to those given at the Arnold Arboretum, the New York Botanical Garden and the Morton Arboretum.

This coming summer the Director and members of his staff will offer a course on Woody Plant Materials, which will be open to students in the University's Summer School Session.

#### PUBLIC RELATIONS

The present Director is keenly aware of the fact that the Morris Arboretum possesses a high potential for service to the community and is eager to make the resources of the Arboretum available to an ever-widening circle. Attention is therefore currently being given to methods which will bring about an increased number of visitors, especially at such times as it may be possible, through dignified publicity, to highlight the attractiveness of special groups of plants, such as magnolias, azaleas, roses, etc. The Director has recently accepted the co-chairmanship of the Landscape Committee of the Chestnut Hill Development Group. This serves to establish a close relationship between the Arboretum and the community in which it is located.

#### RECREATION AREA

Plans have been completed for the establishment of a small recreation area along Wissahickon Creek near the mill. This will include rest rooms, an outdoor fire-place and playing fields for softball, horse-shoes, badminton, etc. Funds for this purpose have been made available by the Undergraduate Council and the Women's Student Government Association of the University of Pennsylvania and the area will be available after May 1 for outings and picnics scheduled by students and alumni of the University. Outside organizations may also apply for use of the area, but preference will be given to student groups which have made possible its creation.

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